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(54) Title: ADHESIVE PRODUCTS.

(57) Abstract

Adhesive compositions comprising a core of an adhesive and a coating of removable material are described herein. The adhesives comprise a moisture-activated non-permanent adhesive composition comprising a hydrophobic adhesive polymer core surrounded by a water soluble, essentially anhydrous coating such as an alkylvinyl ether/maleic acid or acid salt mixture.

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ADHESIVE PRODUCTS

This invention relates to an adhesive product. In a preferred form, it relates to a non-permanent adhesive product where the adhesive is presented in a differentially releasable form accomplished by surrounding a comparatively hydrophobic adhesive with a water soluble coating. These adhesives are useful in many areas including the dental arts, as ostomy devices, as electrode-lead gels and the like.

Background

A number of different polymers have traditionally been used as non-permanent adhesives for providing temporary bonding between various types of surfaces. One example of their use in this manner is in forming bonds between tissue and plastics such as is often done when bonding dentures to gums to stabilize the dentures in the mouth. In the case of denture, these polymers are applied to the cavity of the denture coming in contact with the gums, pressure from biting acts to spread the polymer across the gum/denture interface and the tackiness of the polymer acts as a bond between the tissue and denture material.

A number of commercial formulations utilizing this approach are widely available to denture wearers. In the United States, see for example Fixodent® sold by Richardson-Vicks and Orafix® produced by SmithKline Beecham Consumer Brands. These products work by virtue of an adhesive polymer dispersed or suspended in a proprietary hydrophobic carrier which is spread on the dentures, forming a bond between denture material and gum when worn in a normal fashion.

Current denture adhesives hydrate quickly, reach a peak adhesion force in a few minutes to an hour which then declines fairly quickly thereafter, e.g. 2 to 6 hours. The improvement provided in this invention is that particles of hydrophobic adhesive are coated with an essentially anhydrous water-soluble material which breaks down during use in a moist environment making available the entrapped polymer so it can form an adhesive bond between the materials with which it is comes into contact. A particularly useful embodiment is where the coating break-down rate varies among particles providing new sources of adhesive over time. Coating break-down rates can also be manipulated by formulating several coatings, each with different break-down rate characteristics, and applying the same amount, or a differing amount, to the core particles.

Summary of the Invention

This invention comprises a moisture activated non-permanent adhesive composition comprising a hydrophobic adhesive polymer core surrounded by a water soluble, essentially anhydrous coating. One of the embodiments of this invention comprises a composition where the adhesive core is differentially released from the coating. Another is a multilayer particulate where outermost layer becomes adhesive

on hydration and then breaks down releasing hydrophobic adhesive core polymer.

Specific Embodiments of the Invention

In this work, hydrophobic is defined as something which will not dissolve significantly in deionized water at room temperature after three day. Significantly here refers to a couple of percentage points. Hydrophilic means something which immediately dissolves in deinonized water with agitation at room temperature.

The basic components of this invention are a hydrophobic polymer with non-permanent adhesive properties in a particulate form which is surrounded by a water-soluble coating of some sort which may be an adhesive in and of itself when hydrated. Because polymer tackiness or release is moisture dependent, these particles will be essentially anhydrous in preparation and storage. Less than 5 percent water is believed to provide the most useful finished particles and when incorporated into a carrier or the like, a similar limitation is most useful.

The adhesive core can be spherical or irregular in shape or may be comprised of a number of particles. Single particles may be coated or if particles are small, it may be useful to aggregate several particles and coat them as a bundle. For example, fluidized bed coating technology may be used to coat individual particles where particle size is sufficiently large to be compatible with the coating apparatus. Alternatively, where particles are small, a granulation process may be the most useful means for coating the adhesive.

Useful core material may be any hydrophobic polymer having adhesive properties sufficient to form a non-permanent (breakable) bond between two surfaces. Many naturally occurring gums and synthetic polymers may be used for this purpose. A non-comprehensive list includes: gum guar, gum Arabic, Karaya gum, gelatine, gum tragacanth, gum acacia, pectin, celluloses (e.g.. carboxymethyl cellulose derivatives),hydroxypropylmethyl cellulose (HMPC), polymethacrylates, acrylic acid polymers, cationic polyacrylamide, lower alkylvinyl ethers and their co-polymers (e.g.. methylvinyl ether/maleic anhydride copolymers), polyalkylene oxides (e.g.. ethylene oxide), polyvinyl pyrrolidones (PVP), and the like.

All of the mentioned polymers are commercially available or can be extracted from natural sources by published methods. For example, lower alkylvinyl ether copolymers (maleic anhydride or maleic acid and the salts) and the PVPs can be purchased from International Speciality Polymers of Wayne, New Jersey, USA. GantrezÒ and PlasdoneÒ are the two trade names under which ISP sells these particular polymers. The Gantrez series, those useful as core adhesives, are denoted as S (MW ca 18,000 and 70,000), MS (MW ca 60,000 - 75,000) and AN (MW ca 18,000-80,000). Gums, celluloses and other polymers from natural sources are available from a number of biological and chemical supply houses world-wide.

Polymer size (molecular weight) is not critical so long as the requisite adhesiveness, tackiness, is present.

While it is anticipated any of these polymers will be useful adhesives, the surfaces to be bonded may influence their selection for a particular use. One area where polymer selection becomes critical is in bonding one surface to tissue, particularly absorptive or highly innervated tissue. For example, forming a transient bond between an electrode and skin may dictate a particular type of polymer selected for skin moisture content, hold and compatibility with conductive agents. Polymer selection involving a moisture rich, soft tissue environment such as the mouth may dictate the selection of a different polymer. Based on the work already done by others, no single adhesive polymer is likely to provide an optimum formulation in all uses and environments. No attempt is made here to prescribe a polymer or polymers for every situation. It is expected that minimal testing using the standard techniques illustrated herein, or generally available to the artisan, will readily provide the key to polymer optimization for any given use.

In selecting an adhesive polymer, it should be kept in mind that mixtures can be used; pure polymers are not required and in certain contexts may be contra-indicated. Furthermore, the core particulates may contain non-adhesive excipients which assist with spreading the adhesive or enhancing its adhesive properties by physical or chemical means, or bulking agents.

Preferred adhesive polymers include the alkylvinyl ethers and their copolymers, particularly methylvinyl ether/maleic anhydride polymers (MVE/MA). A most preferred polymer of this type is available under the name Gantrez AN 169; it is a methylvinyl ether/maleic anhydride copolymer with a molecular weight of about 67,000. Other useful Gantrez polymers are Gantrez S 97 and Gantrez MS 955. Another preferred group of adhesives are the polyvinyl pyrrolidones (PVP) of various molecular weight ranging from 12,000 to 2 million or thereabouts. These are available commercially or can be made by published methods. Commercial sources include the ISP of Wayne, New Jersey which sells these PVPs under the name Plasdone. Further, there are cellulose gums produced by such companies as Aqualon Corp. of Wilmington, Delaware, USA. A most preferred cellulose gum is Cellulose Gum 7H4XF and 7H3SXF sold by Aqualon which is sodium carboxymethyl cellulose, food grade.

Coatings comprise hydrophilic materials, preferably a polymer, which are compatible with the environment of their intended use. Naturally occurring polymers and synthetic polymers may be used. These polymers may have adhesive properties as well. Any of the many water-soluble polymers currently available or which may be developed, including water-soluble forms of the hydrophobic adhesives recited above,

can be used. Two preferred coating are the lower alkylvinyl ether/maleic acid copolymers, particularly the alkali metal salts of these copolymers, and certain polyvinyl pyrrolidones. The most preferred coatings are methylvinyl ether/maleic acid (or its Ca and Na salts) or the PVP Plasdone K 120 or K 90.

Coatings can be comprised of a single polymer or mixtures of several different polymers. Choice is directed by any number of factors which include the desired release rate, the amount of moisture present in the environment where the product will be used, and the like. Since choice is situation driven, no single polymer or mixtures will be universally useful. Methods for selecting a coating or coatings are given below. That information in combination with the general state of knowledge on polymer coatings of this type make it a simple task for one to optimize the coating selection.

Coatings will comprise between about 0.01 to 50% by weight of the composition; this is with reference to the core/coated formulation only. Preferably the coating will comprise between about 5 to 25% of the finished coated composition.

A longer lasting adhesive product can be achieved via these coated particles by varying the coating thickness or varying the break-down characteristics of different populations in a finished product such as a denture cream adhesive. Both characteristics can be combined as a third means of increasing the life of the adhesive product. For example several batches of particulates can be prepared where the coating percentage varies stepwise, e.g.. 0.1%, 1%, 2%, 5%, etc. Mixing particles from each of these batches gives a composition which provides a certain concentration of adhesive when the 0.1% coating is dissolved (or mechanically removed) and then at some later time more adhesive is released as the 1% coating is removed, and so on until the most heavily coated cores are exposed. By this means the holding power of the formulation can be replenished over time, that is the core is differentially released over time. Alternatively the coating polymer makeup can be manipulated to effect a differential release rate. An example of this would be to combine water-soluble polymer X which has release rate Y with various concentrations of polymer A which has release rate B. This combination can then be applied at the same loading rate to core polymer, or can be applied in a series of different concentrations, i.e., of increasing thicknesses, to different batches of core particulates. Then by mixing coated particulates from several batchs, formulations with extended release of adhesive can be made.

Moisture content of the composition should be controlled to less than five percent by weight for best results in storing and later using this product. Water can be used in coating the core particulates. For example, the coating polymer can be dissolved in an aqueous medium for doing aqueous coating or granulation. But

thereafter, the coated product should be dried and stored under essentially anhydrous conditions to prevent potential breakdown of the coating and activation of the adhesive component.

Core particle size is of secondary consideration to the invention itself, but will influence the ease of handling these formulations. By way of illustration, hyrophobic polymer is ground to an acceptable fineness, preferably between about sub-micron to about 250 microns and then coated with the water-soluble polymer by some means. Coating can be performed by any number of methods which are available for coating with water-soluble polymers. One procedure comprises dissolving the coating in a suitable solvent, e.g.. water, and spray it onto the fluidized core particles (Fluid-bed granulator) or wet granulate it with the core material (Planetary mixer). Other methods and devices may be used as well.

When coating is completed, moisture content is reduced to less than five percent by some means. It is expected that most drying methods can be used, so long as they reduce the moisture content below 5% and do not adversely affect the essential nature of the composition. Once dried, the product should be handled in a manner which avoids exposing it to excess moisture which could be absorbed and degrade the coating.

A coated composition can be used as is or incorporated into a carrier, vehicle, or diluent to enhance manipulation or application in a given environment. These "finished" products, solids, semi-solids, gels, liquids and powders may be prepared with these coated particles, keeping in mind the need to exclude moisture. For example, the coated product can be dispersed in a hydrophobic liquid such as mineral oil or vegetable oil to form a suspension, or dispersed in such a way as to form a paste, cream or gel in a mineral oil-petrolatum combination. These coated particles may be incorporated into powders as well.

In addition to vehicle-type excipients, other agents may be incorporated into these finished products. For example one may include another adhesive to enhance the initial holding power of the product. Other auxiliary materials such as flavoring agents, coloring agents, deodorizers, stabilizers, preservatives, and the like may be present as well. Local anesthetics such as benzocaine, dyclonine, etc. and antibacterials such as bacitracin, polymyxin B sulfate and the like may be added as well.

These products have many uses. For example tissue/tissue bonding, tissue/plastic, tissue/cloth, tissue/metal or tissue/ceramic interfaces are several examples of where these compositions can be used. The present compositions are particularly useful for affixing dentures or ostomy devices or for surgical procedures which require temporary displacement of tissue. Electrode lead gels are another area

where these coated particles will have use. They may also be applied to topical and/or mucosal wounds as a protective agent. Drugs may be incorporated into the core, coating or incorporated into a formulation containing coated particles and vehicle.

When used as a denture adhesive, a formulation containing the coated particles is applied to the denture material and spread over the surface which will have tissue contact. The denture is placed in the mouth where an immediate bond is formed by uncoated gums or polymers. In time, moisture from saliva will hydrate the coating, it will break down due to pH, solvent affects and pressure from biting, exposing the core which will bond to gum and denture creating an adhesive bridge between the two. It should be noted it is not the intent of this invention to provide a permanent adhesive. Rather, the nature of the adhesive is one which allows the device or tissue to be separated from its substrate readily with out excessive force and without damaging the bonding surface or, in the case of tissue, without irritating or sensitizing it.

Test Procedures

Compositions were tested for adhesive properties on denture material using an INSTRON Stress-Strain Analyzer, Model 1125, Instron Corporation, Canton, Massachusetts, USA. It was used with a 1000 lb. reversible load cell (Instron Corporation) to test various formulations comprised of coated particles or coated particles confected with a commercial denture adhesive base (OrafixÒ). Denture material was simulated by the use of polymethacrylate plates. Simulated saliva was prepared. Using these materials the following procedure was used to test various formulations:

Two gram samples of a formulation were first prepared. The upper and lower plates (PMMA) of the Instron apparatus were brought together to obtain a zero position. The upper plate was then raised 0.06 inches and the upper cycle limit set at this point. The upper plate was then lowered and the lower cycle limit set. In its lowest position, the upper plate was distanced 0.03 inches above the lower plate.

With these Instron settings determined, the upper plate was then raised and 2 grams of a sample were spread uniformly over the surface of the lower plate at a 1/16 to 1/8 inch thickness after which simulated salivary fluid was applied to barely cover the applied sample.

Then the Instron crosshead was cycled between the previously set limits at a crosshead spread of 0.2 inches per minute. The instron chart was set in the "continuous" mode at a speed of 2 inches per minute to

record the compression and adhesion force for each cycle.

One hundred cycles were run for each sample. Each recording was analyzed and the adhesions force in pounds for the 1st, 5th, 10th and every decimal thereafter up to the 100th cycle were recorded and analyzed, usually by plotting out these data.

The following examples as recited to illustrate, but not limit the invention. Reference is made to the appended claims for determining what is reserved to the inventors hereunder.

Example 1

A coated particle employing an alkylvinyl/maleic anhydride polymer was prepared using the ingredients given in Table I.

Table IA

Coated Adhesive Particles

Ingredients	Amount (% W/W)
Adhesive Core Material	
Methylvinyl ether/maleic anhydride (Gantrez AN 169, MW 67,000	72.72
Polyvinyl pyrrolidone (PVP K 30, MW 42,000)	18.18
Coating Material	
Methylvinyl ether/maleic acid Ca/Na mixed salts (Gantrez MS 955)	9.10
	100.00%

Guar gum, Karaya gum, hydrophobic PVPs and other adhesive polymers may be substituted for the methylvinyl ether/maleic anhydride or PVP K 30 in the above composition. Combinations of two or more of these polymers, including the MVE/MA-PVP mix will also act as a useful core adhesive.

Table IA

Ingredients	Amount (% W/W)
Adhesive Core Material	
Guar gum	90.90
Coating Material	
Methylvinyl ether/maleic acid Ca/Na mixed salts (Gantrez MS 955)	9.10
	100.00%

Coated particle were prepared as follows: In a planetary mixer was dry blended Gantrez AN 169 and Plasdone K 30 for fifteen minutes. A previously prepared Gantrez MS 955 binder solution (10% Gantrez MS 955 in water) was then added into the planetary mixer over a period of about 20 minutes. Blending was continued until a uniformly moist granular mass was obtained. This mass was screened through a #14 mesh (1400 microns) sieve and transferred to drying trays for drying at about 45 degrees C for 6 to 8 hours. Trays were removed from the dryer, cooled and the dried product passed through a #60 (250 microns) mesh screen and tested for moisture content to assure it was less that 5%. Dried material was stored in a bulk for later use.

Example 2

Denture adhesive formulations were prepared by incorporating one of the coated composition of Example 1 into a hydrophobic base. The ingredients for these formulations are given in Table II.

Table II

Denture Adhesive Formulations

Ingredients	Amount (% W/W)	Amount (% W/W)	Amount (% W/W)	Amount (% W/W)	Amount (% W/W)	Amount (% W/W)
Adhesive particles*	6.25	12.50	-	3.00	25.00	25.00
Gantrez - MS955	6.25	-	12.50	9.50	-	10.22
CMC Type 7H4XF	22.72	22.72	22.72	22.72	10.22	-
White petrolatum	30.81	30.81	30.81	30.81	25.81	25.81
PVP K 90	15.21	15.21	15.21	15.21	15.21	15.21
Mineral oil	11.05	11.05	11.05	11.05	11.05	11.05
Isopropyl palmitate	5.00	5.00	5.00	5.00	5.00	5.00

Isopropyl myristate	2.50	2.50	2.50	2.50	2.50	2.50
Menthol	0.16	0.16	0.16	0.16	0.16	0.16
Flavor	0.05	0.05	0.05	0.05	0.05	0.05
	(100 %)	(100 %)	(100 %)	(100 %)	(100 %)	(100 %)

* Example 1 particles.

Coated particles and/ or other particles were dispersed in a melt containing mineral oil, white petrolatum, isopropyl palmitate, and isopropyl myristate. When dispersion cooled to ca 45 degrees C, the menthol and flavor were added with stirring. This product was then filled into aluminum tubes.

What is claimed is:

1. A moisture activated non-permanent adhesive composition for use as a dental or medical device adhesive comprising a hydrophobic adhesive polymer core surrounded by a water soluble essentially anhydrous coating wherein the core comprises an lower alkylvinyl ether/maleic anhydride, polyethylene oxide, carboxymethyl cellulose sodium, polyvinyl pyrrolidone, gelatin or Karaya gum, individually or in admixture.

2. The composition of claim 1 where the coating an alkylvinyl ether/maleic acid or acid salt mixture.

3. The composition of claim 2 where the lower alkylvinyl ether is methylvinyl ether.

4. The composition of claim 3 which contains less than 5% water by weight.

5. The composition of claim 4 where the coating comprises 0.01 - 50% by weight of the compositon.

6. The composition of claim 5 having a core comprising methylvinyl ether/maleic anhydride having a molecular weight between 18,000 and 80,000 and PVP having a molecular weight between about 12,000 to 2 million and a coating comprising of methylvinyl ether/maleic acid or a calcium and sodium mixed salts thereof.

7. The composition of claim 6 where the coating comprises between 5 - 25% by weight.

8. A composition according to claim 7 wherein the core comprises 72.72% methylvinyl ether/maleic anhydride of molecular weight 67,000, 18.18% PVP of molecular weight 42,000 and the coating comprises 9.10% methyl vinyl ether/maleic acid calcium/sodium salt.

9. A composition according to claim 8 where the core is Gantrez AN169.

10. A composition according to claim 1 where the coating becomes adhesive upon hydration.

11. A composition according to claim 10 where the coating is Gantrez S or MS or mixtures thereof.

12. A composition according to claim 11 in paste form for dental use wherein the adhesive particles comprise 12.5% by weight of the paste wherein the core is comprised of Gantrez AN 169 (72.72%) and Plasdone K30(18.18) and the coating is Gantrez MS 955 (9.10%); white petrolatum (30.81%); mineral oil (11.05%); isopropyl palmitate (5.00%); isopropyl myristate (2.50%); menthol (16%); and flavor (0.05%).

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US92/07734

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :C08F 267/04, 271/02; C08L 35/00, 39/06
US CL :523/118,120,201,205,206
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/462,492,494,496,497

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US, A, 3,691,090 (KITAJIMA et al) 12 September 1972, columns 1,2 and 3	1-11 1-11
X Y	US, A, 4,014,987 (HELLER et al) 29 March 1977, columns 3,4,7,8,15,16,28 and 29	1,11 1,10
X Y	US, A, 4,088,798 (MICHAELIS) 09 May 1978 columns 3-5 and 6-8	1-12 1-12
X Y	US, A, 4,521,551 (CHANG et al) 04 June 1985 columns1-4, especially column 3, lines 22-29	1-12 1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 20 OCTOBER 1992	Date of mailing of the international search report 14 DEC 1992
Name and mailing address of the ISA/ Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer ANDREW E.C. MERRIAM Telephone No. (703) 308-2351

Form PCT/ISA/210 (second sheet)(July 1992)★

B. FIELDS SEARCHED
Electronic data bases consulted (Name of data base and where practicable terms used):

APS: (1) maleic acid and (alkyl vinyl ether or methyl vinyl ether); (2) (core and shell or core or core and sheath or graft and (core or shell)) and (copolymer or polymer); (3) (dental adhesive or ostomy or drug delivery or wound protectant or (3) (electrode gel); (4) (523/clas or 524/clas or 424/clas); (5) 1-4.

DERWENT-ACC-NO: 1993-117482

DERWENT-WEEK: 199610

TITLE: Moisture-activated, non-permanent, two=part adhesive compsn., used as dental fixative comprising hydrophobic adhesive polymer core e. g. methyl-vinyl!-ether!-maleic:anhydride! copolymer with polyvinyl:pyrrolidone, and water-soluble anhydrous coating

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PATENT-ASSIGNEE: SMITHKLINE BEECHAM CORP[SMIK]

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PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
WO 9306144 A1	April 1, 1993	EN
EP 604537 A1	July 6, 1994	EN
JP 06511001 W	December 8, 1994	JA
EP 604537 A4	February 15, 1995	EN

DESIGNATED-STATES: CA JP US AT BE CH DE DK ES FR GB GR IE IT LU MC NL SE DE ES FR GB IT NL

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WO1993006144A1	N/A	1992WO-US07734	September 14, 1992
EP 604537A4	N/A	1992EP-920149	September 14, 1992
EP 604537A1	N/A	1992EP-920149	September 14, 1992
EP 604537A1	N/A	1992WO-US07734	September 14, 1992
JP 06511001W	N/A	1992WO-US07734	September 14, 1992

JP 06511001W	Based on	1993JP-506141	September 14, 1992

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TYPE	IPC DATE
CIPS	A61K6/00 20060101
CIPS	A61L24/04 20060101
CIPS	A61L24/06 20060101
CIPS	A61L24/08 20060101
CIPS	A61L24/10 20060101
CIPS	C08F271/02 20060101
CIPS	C08F291/00 20060101
CIPS	C09J151/00 20060101
CIPS	C09J151/06 20060101
CIPS	C09J191/00 20060101

ABSTRACTED-PUB-NO: WO 9306144 A1

BASIC-ABSTRACT:

Adhesive compsn. for use as a dental or medical device adhesive comprises; (i) a hydrophobic adhesive polymer core (I) surrounded by (ii) a water soluble essentially anhydrous coating (II). (I) comprises a lower alkylvinyl ether/maleic anhydride, polyethylene oxide, carboxymethyl cellulose sodium salt, polyvinyl pyrrolidone, gelatin or Karaya gum, individually or in admixture.

USE/ADVANTAGE - The coating becomes adhesive upon hydration. The adhesive prod. is partic. useful for placing dentures or for ostomy devices or for surgical procedures which require temporary displacement of tissue. They are also useful as a protection for wounds in which drugs are incorporated into the core (I), and in electrode lead gels. The prods. can bond tissue/tissue, tissue/ plastic, tissue/cloth, tissue/metal or tissue/ceramic interface

TITLE-TERMS: MOIST ACTIVATE NON PERMANENT TWO=PART ADHESIVE COMPOSITION DENTAL FIX COMPRISE HYDROPHOBIC POLYMER CORE METHYL POLYVINYL POLYETHER MALEIC POLYANHYDRIDE COPOLYMER PYRROLIDONE WATER SOLUBLE ANHYDROUS COATING

ADDL-INDEXING-TERMS: DENTAL FIXATIVES

DERWENT-CLASS: A11 A14 A25 A96 B07 D21 D22 G03

CPI-CODES: A12-V02B; A12-V03C1; B04-C02A2; B04-C02D; B04-C03C; B12-L03; D08-A02; D09-C04B; G03-A; G03-B02A; G03-B02D; G03-B02E;

CHEMICAL-CODES: Chemical Indexing M1 *01* Fragmentation Code H4 H402 H482 H5 H589 H8 M280 M312 M323 M332 M342 M383 M393 M423 M430 M510 M520 M530 M540 M620 M782 P923 P942 Q254 R021 V0 V743 Specific Compounds R03120 Registry Numbers 129743

Chemical Indexing M1 *02* Fragmentation Code F011 F012 F423 H2 H211 H7 H713 H721 J5 J521 L9 L941 M210 M212 M273 M281 M320 M423 M430 M510 M521 M530 M540 M782 P923 P942 Q254 R021 V0 V743 Specific Compounds R00546 Registry Numbers 75344

Chemical Indexing M1 *03* Fragmentation Code F012 F015 F112 H581 H713 H721 J522 M210 M211 M212 M272 M280 M282 M320 M423 M430 M510 M520 M521 M530 M540 M782 P923 P942 Q254 R021 V743 Specific Compounds R00824 R00843 Registry Numbers 7162 790

Chemical Indexing M1 *04* Fragmentation Code
H5 H521 H8 J0 J011 J1 J171 M280 M311 M321
M342 M381 M391 M423 M430 M630 M782 P923
P942 Q254 R021 V0 V713 Specific Compounds
R01835 Registry Numbers 133912

Chemical Indexing M1 *05* Fragmentation Code
M423 M430 M782 P923 P942 R021 V751

UNLINKED-DERWENT-REGISTRY-NUMBERS: ; 1835U ; 1849U ; 2044U

POLYMER-MULTIPUNCH-CODES-AND-KEY-SERIALS:

Key Serials: 0013 0038 0044 0062 0218 0231 0866 0880 0906
1279 1417 1588 1985 1986 2001 2585 2682 2726
2743 2761 2764 2766 3198 3251 3289

Multipunch Codes: 028 034 04- 040 06- 09- 091 093 101 104 105 106
147 155 157 18- 198 230 231 24- 240 252 255 256
27& 336 443 477 52& 525 53& 532 533 535 575
58& 583 589 609 623 627 645 688 720 722 728

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: 1993-052205